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Docket No. 2328-050A

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	
Inventors: Jian J. CHEN et al.	: Confirmation No.: 3505
	:
U.S. Patent Application No. 10/647,347	: Group Art Unit: 1763
	:
Filed: August 26, 2003	: Examiner: Luz L. ALEJANDRO
	:
For: INDUCTIVE PLASMA PROCESSOR METHOD	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attn: BOARD OF PATENT APPEALS AND INTERFERENCES

BRIEF ON APPEAL

Further to the Notice of Appeal filed June 9, 2005, in connection with the above-identified application on appeal, herewith is Appellant's Brief on Appeal. Authorization for payment of the $500 statutory fee is attached.

To the extent necessary, Appellant hereby requests any required extension of time under 37 C.F.R. §1.136 and hereby authorizes the Commissioner to charge any required fees not otherwise provided for to Deposit Account No. 07-1337.

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TABLE OF AUTHORITIES

Cases

Other Authorities

I. Real Party in Interest

The real party in interest is Lam Research Corporation, a leading manufacturer of processors using plasma for fabricating integrated circuits. The Lam web site is lamrc.com

II. Related Appeals and Interferences

There are no related appeals and/or interferences.

III. Status of Claims

Claims 1-25 and 27-30 are cancelled.

No claims are allowed.

Claims 26 and 31 are rejected on multiple bases under 35 USC 103(a). Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Holland et al. (USP 5,759,280) in view of Tobin et al. (USP 5,619,103), and further in view of Savas (USP 5,983,828). Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Holland et al. (USP 5,759,280) in view of Savas (USP 5,983,828). Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al. (USP 5,795,429) in view of Tobin et al. (USP 5,619,103), and further in view of Savas (USP 5,983,828). Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al. (USP 5,795,429) in view of Savas (USP 5,983,828). Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (USP 6,164,241) in view of Tobin et al. (USP 5,619,103), and further in view of Savas (USP 5,983,828). Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (USP 6,164,241) in view of Savas (USP 5,983,828). Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (USP 6,288,493) in view of Tobin et al. (USP 5,619,103), and further in view of Savas (USP 5,983,828). Claim 31 is rejected

under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (USP 6,288,493) in view of Savas (USP 5,983,828).

IV. Status of Amendments

An amendment under 37 C.F.R. 1.116, filed May 9, 2005, was not entered. An amendment filed under 37 C.F.R. 1.116 on July 21, 2005 was entered.

V. Summary of Claimed Subject Matter

The claimed subject matter is directed to a method of enabling plural different processors of the same type, but which have differing azimuthal electric field and plasma density distributions from processor to processor, to each have optimum uniform plasma distribution (page 32, line 22-page 33, line 3). Such a method is particularly useful in connection with making such processors (page 32, line 15, and page 1, lines 10-14).

The plasma flux distribution is controlled on a workpiece 32 (page13, line 23) of an inductive plasma processor including a vacuum chamber 20 and plasma excitation coil 24 having a central axis 44 (page 12, lines 12-14; page 13, lines 2-6; page 16, line 6). The coil has plural windings 40, 42 that are connected in parallel (page 16, line 5) and are driven by an excitation source 26 (page 13, lines 2-6). The plural parallel connected windings are concentric with the axis 44 of an exterior winding 42 that surrounds the remainder of the coil (page 16, lines 5-23).

The method comprises positioning the exterior winding 42 relative to another winding 40 of the coil so the plasma density incident on the workpiece has a predetermined desired relationship. The positioning step includes turning the exterior winding 42 and interior winding 40 of the coil relative to each other about axis 44 (page 32, lines 17-18). The exterior winding 42 is turned

relative to winding 40 to assist in controlling azimuthal electric field distribution and azimuthal plasma density distribution of the processor (page 32, lines 5-17). The method is performed on a plurality of different processors of the same type (page 32, lines 22-23). The different processors, however, have differing azimuthal electric field and plasma density distributions from processor to processor (page 32, lines 22-23). The exterior winding 42 of each particular processor is turned relative to the remainder of the coil 24 of the particular processor until tests indicate optimum uniform plasma distribution is achieved in each processor (page 32, lines 1-3). As a result, all of the plasma processors of a particular type, that have a tendency to otherwise have differing azimuthal electric field and plasma density distributions from processor to processor, have an optimum uniform plasma distribution in each processor.

VI. Grounds of Rejection to be Reviewed on Appeal

A. The obviousness rejections of claim 26 based on: (1) Holland et al., in view of Tobin et al., and further in view of Savas; (2) Ishii et al. in view of Tobin et al. and further in view of Savas; (3) Chen et al., in view of Tobin et al. and further in view of Savas; and (4) Lee et al., in view of Tobin et al. and further in view of Savas.

B. The obviousness rejections of claim 31 based on: (1) Holland et al. in view of Savas; (2) Ishii et al. in view of Saves; (3) Chen et al. in view of Savas; and (4) Lee et al. in view of Savas.

VII. Argument

A. The Problem Solved By The Claimed Method

Plasma processors of the same type typically have differing azimuthal electric field and plasma density distributions from processor to processor. This is because of anomalies from processor to processor. The anomalies can be due to various reasons, such as variations in the (1) components of the processors, at the time of fabrication and assembly, and/or (2) operating conditions in different environments having differing ambient magnetic fields that affect the magnetic fields of processors having coils that produce magnetic and electric fields. Typical prior art plasma processors having coils were not well equipped to handle this problem. The typical prior coils were manufactured on a prescribed basis, having a fixed geometry that was not subject to change once the coil was manufactured and/or installed in the processor. The present invention, as defined by claim 31, resolves this problem by moving the exterior winding of a coil having plural parallel connected windings relative to the remainder of the coil of a particular processor until tests indicate optimum uniform plasma distribution is achieved in each of a plurality of such processors. The invention as defined in claim 26 resolves this

problem by turning the exterior winding of each particular processor relative to the remainder of the coil of the particular processor until tests indicate optimum uniform plasma distribution is achieved in each of plural processors.

The prior art relied on by the Examiner fails to consider this problem and does not include the foregoing steps of claims 26 and 31. The final rejection admits the foregoing steps are not found in the primary references and does not show how they are included in the secondary/tertiary steps in the final rejection. Hence, the Examiner has not even attempted to establish a prima facie case of obviousness.

B. The four different primary references

1. Holland et al., USP 5,759,280

Holland et al., co-assigned with the present application, discloses a plasma processor including a coil 24 having a central axis 50, and four concentric turns formed by loops 40, 42, 44, 46 and 48 that are connected in series with each other, as stated in column 6, line 63-column 7, line 3, and as is evident from inspection of Figure 2A. Hence, the statement in the Final Rejection that windings 42, 44, 46 and 48 are connected in parallel with each other is incorrect. This fact alone should be sufficient to overcome the rejections of claims 26 and 31, based on Holland et al.

Because the loops 40-48 of the Holland et al. coil are connected in series with each other by straps 72, 78 and 82, which, as illustrated in Figure 2B have a substantial structure, the exterior loop is not amenable to being moved or turned, as required by claims 26 and 31. The Holland et al. coil structure is quite rigid and has a predetermined shape. Hence, one of

ordinary skill in the art would not have performed the method of claims 26 and 31 on the Holland et al. coil.

2. Ishii et al., USP 5,795,429

Figure 9 of Ishii et al., the figure relied upon by the Examiner in the Final Rejection, discloses a coil including two spiral windings or antennae 24A and 24B, connected to be responsive to two different AC sources 28A and 28B, respectively. Winding 24A is concentric with winding 24B, and surrounds winding 24B. Ishii et al. has no disclosure of windings 24A and 24B being moved relative to the remainder of the coil of a particular processor, no less being moved until tests indicate optimum uniform plasma distribution is achieved in each of plural processors, as claim 31 requires. Further, there is no disclosure in Ishii et al of the requirement of claim 26 for winding 24A to be turned relative to winding 24B, no less being turned to assist in controlling azimuthal electric field distribution and azimuthal plasma density distribution of the processor. Ishii et al. also has no disclosure of the requirement of claim 26 for the method to be performed on plural different processors of the same type having differing azimuthal electric field and plasma density distributions from processor to processor, such that the exterior winding of each particular processor is turned relative to the remainder of the coil of the processor until tests indicate optimum uniform plasma distribution is achieved in each processor.

3. Chen et al., USP 6,164,241

Chen et al., commonly assigned and co-invented by the inventors of the present application, is relied on by the Examiner for the disclosure in Figure 6. Figure 6 discloses coil 1 and coil 2, which are concentric with each other and are connected in parallel to an RF

source. Each of the coils has an input excitation terminal connected to the RF source by a separate capacitor, such that coil 1 and coil 2 are connected to the RF source by capacitors C_1 and C_2. Each of the coils is also connected to ground by a capacitor, so that a terminal of coil 1 opposite from the coil connected to capacitor C_1 is connected to ground by capacitor C_3 and the terminal of coil 2 opposite from the terminal connected to capacitor C_2 is connected to ground by capacitor C_4. The description of Figure 6, at column 9, lines 23-column 10, line 15, indicates the values of capacitors C_1-C_4 can be adjusted to adjust the current distribution in the coils. In addition, this portion of the Chen et al. reference indicates it is possible to reverse the angular position of coil 1 relative to coil 2 by providing a configuration where the openings are aligned. However, the Chen et al. patent indicates that such alignment is undesirable because it results in lower power coupling.

Hence, Figure 6 and the description therefore of Chen et al. do not disclose the requirement of claim 26 for the method to be performed on plural different processors of the same type having differing azimuthal electric field and plasma density distribution from processor to processor, wherein the exterior winding of each particular processor is turned relative to the remainder of the coil of a particular processor until tests indicate optimum uniform plasma distribution is achieved in each processor. In addition, Figure 6 and the description thereof of Chen et al. do not disclose the requirement of claim 31 of performing the method on plural different processors of the same type having differing azimuthal electric and plasma density distributions from processor to processor, wherein the exterior winding of each processor is moved relative to the remainder of the coil of the particular processor until tests indicate optimum uniform plasma distribution is achieved in each processor.

4. Lee et al., USP 6,288,493

The Examiner relies on Figure 3B of Lee et al. and the description thereof. Figure 3B of Lee et al. is directed to a coil including three antennas 310a, 310b and 310c, which are connected by capacitors 312a, 312b and 312c to high frequency power source 102 and impedance matching box 304'. There is no disclosure in Lee et al. of the requirements of claims 26 and 31, as discussed supra in connection with the Ishii et al. reference.

C. The secondary and tertiary references

1. Tobin et al., USP 5,619,103

Tobin et al., in the embodiments of Figs. 3-6, discloses plasma processors each including a single spiral coil bearing reference numerals 32, 52 and 82, that are disclosed as being movable in a direction normal to the planar surface of these spiral coils; column 8, lines 63-65. There is no evidence that such movement of the coil in a plane normal to the planar surface of the coil has an effect on controlling azimuthal electric field distribution and azimuthal plasma density distribution, as required by claim 26 and there is no indication that there is movement of the exterior winding the coils 32, 52 or 32 of each processor relative to the remainder of the coil of the particular processor until tests indicate optimal uniform plasma distribution is achieved, as claims 29 and 31 require.

Fig. 7 of Tobin et al. discloses an arrangement including a plurality of spatially parallel, straight conductors 122, each of which is connected to a separate generator and matching circuit. A further embodiment of Tobin et al. is illustrated in Figure 8, wherein a coil includes a single conductor 132, with straight branches 134, electrically connected in parallel to RF generator and matching circuit 136. Modifications of the single conductor 132 having many

parallel paths 134 are illustrated by the flattened helix of Figures 9a-c, and the square coil flattened helix of Figures 10a-d. Column 8, lines 34-57 indicates the structures of the Figures 7-10 can be moved relative to each other. The movement can either be away from the dielectric 174 or in the plane of the conductors, to alter the planar spacing of the conductors; column 8, lines 34-57. However, there is no indication in Tobin that either type of movement can be considered as turning the exterior winding relative to another winding. In addition, Tobin does not indicate there is any movement to assist in controlling azimuthal electric field distribution and azimuthal plasma density distribution of the process, as required by claim 26. Further, there is no disclosure in Tobin et al. that the structures of Figures 7-11 are exterior windings that surround the remainder of the coil or that there is an exterior winding that is positioned relative to the remainder of the coil so the plasma density incident on the workpiece has a predetermined desired relationship, as claim 31 requires.

2. Savas, USP 5,983,828

Savas discloses an etcher including two substrates 107a and 107b, located in the same chamber and subject to the same vacuum. Workpiece 107a is beneath a plasma source excited by cylindrical coil 124a, in turn responsive to source 150a. Workpiece 107b is excited by a plasma resulting from excitation by cylindrical coil 124b, in turn responsive to source 150b. Substrates 107a and 107b are located on a common holder 112, connected to a source 152. The Savas etcher is used for processing two workpieces simultaneously. Savas does not disclose different processors of the same type having differing azimuthal electric field and plasma density distributions from processor to processor, wherein the exterior winding of each particular processor is turned or moved relative to the remainder of the coil of the particular

processor until tests indicate optimum uniform plasma distribution is achieved in each processor, as claims 26 and 31 require.

D. The Various Combinations of References Do Not Render the Methods of Claims 26 and 31 Obvious

1. None of the references discloses turning or moving windings of plural processors relative to the remainder of the coils of the processor until tests indicate uniform plasma distribution is achieved in each processor.

None of the references discloses the claim 26 requirement for turning the exterior winding of each particular processor of a plurality of different processors relative to the remainder of the coil of the particular processor until tests indicate optimum uniform plasma distribution is achieved in each processor. The references also fail to disclose the requirement of claim 31, requiring movement of the exterior winding of each particular processor of a plurality of different processors relative to the remainder of the coil of the particular processor until tests indicate optimum uniform plasma distribution is achieved in each processor.

The foregoing requirement for tests and turning or moving to achieve optimum uniform plasma distribution is required, in each of claims 26 and 31, to be performed on plural different processors of the same type having differing azimuthal electric field and plasma density distributions from processor to processor. Appellants realized that processors of the same general type have differing azimuthal electric field and plasma density distributions. Because of this factor, the typical prior art coils, which have fixed relationships between the various windings of the coils, do not provide optimum uniform plasma distribution from processor to processor. Appellants realized this problem can be cured by turning the exterior winding of the coil relative to the remainder of the coil, per claim 26, or by moving the exterior winding

relative to the remainder of the coil, per claim 31. Realization of this problem is missing from any of the references.

The tests which are required by claims 26 and 31 result in optimum uniform plasma distribution from processor to processor. The tests are never mentioned in any of the references. Further, the testing feature is never indicated as being disclosed by any of the references in the Final Rejection.

The four different rejections of claim 29 all admit that each of the primary references and Tobin et al. fail to disclose performing the method on a plurality of different processors of the same type having differing azimuthal electric field and plasma density distributions from processor to processor. Further, the four different rejections of claim 29 admit there is no disclosure in each of the primary references and Tobin et al. of turning the exterior winding of each particular processor relative to the remainder of the coil of the particular processor until tests indicate optimum uniform plasma distribution is achieve in each processor.

In each of the four different rejections of claim 29, Savas is relied upon to disclose different processors that operate independently. The four different rejections then make a leap of faith from the foregoing disclosure in Savas that it would have been obvious to one of ordinary skill in the art to modify the primary references, as modified by Tobin et al., so as to use the process on a plurality of different processors to control azimuthal electric field distribution and azimuthal plasma density distribution of the processors. The four rejections then inaccurately rely on Tobin et al. to disclose an inductive plasma apparatus including a coil in which the different portions of the coil are turned relative to one another in order to vary the electric field distribution and plasma distribution. There is no turning in Tobin et al. In Tobin

et al. there is movement of the spiral planar coil, that do not have parallel connected windings, relative to the plane of the coil. There is nothing in the record that such non-turning movement has any effect on controlling azimuthal electric field and azimuthal plasma density distribution. The same is true of the other Tobin et al. embodiments, as discussed supra in this Brief in Section VI,B,1.

Even if the statement in the Final Rejection concerning Tobin et al. were accurate, Tobin et al. has no disclosure of turning an exterior winding of a coil until tests indicate optimum uniform plasma distribution is achieved in each of plural processors of the same type having differing azimuthal electric field and plasma density distributions from processor to processor. Based on the foregoing, the four different rejections of claim 29 are untenable as being based on obviousness from the four primary references and the secondary Tobin et al. reference, and the tertiary Savas reference.

Claim 31 is rejected as being unpatentable over the four primary references in view of Savas. The rejections of claim 31 admit that the four primary references do not expressly disclose the method being performed on plural different processors of the same type having differing azimuthal electric field and plasma density distributions from processor to processor, wherein the exterior winding of each particular processor is moved relative to the remainder of the coil of the particular processor until tests indicate optimum uniform plasma distribution is achieved in each of plural processors. The Final Rejection states that Savas discloses an apparatus with different processors that operate independently. The Final Rejection then states, without any rationale or evidence to support its position, that in view of fact that Savas discloses different processors, it would have been obvious to one of ordinary skill in the art to

modify the processors of the primary references so as to use a process on plural different processors, because in such a way each processor can have its plasma distribution adjusted based upon the particular process being conducted in the processor. There is no indication in this statement that any tests are performed or that there is movement of the exterior winding of a coil relative to the remainder of the coils of these processors in such a way that a plurality of different processors achieve optimum uniform plasma distribution in each of the plural processors.

The final rejection states that the references make it clear that the shape of the coil is such that in order to form the coil the exterior portion must have been bent or turned relative to the remainder of the coil. The Final Rejection also states that such bending or turning of the coil will cause a predetermined desired relationship, as claimed. However, there is no basis in the Office Action or the references that the exterior portion of the coil is turned or moved relative to the remainder of the coil, in each of a plurality of processors, until tests indicate uniform plasma density distributions in each of the plural processors that are of the same type but having differing azimuthal electric field and plasma density distributions from processor to processor, as required by claims 29 and 31. The position of the Examiner on this point is contrary to established law that evidence must be submitted to support a rejection. In re Lee, 277 F.2d 1338, 1342, 61 USPQ 2d 1430, 1433, 1434 (Fed. Cir. 2002).

Further, the Examiner has failed to meet the burden required to establish a case of inherency. The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993); In re Oelrich, 666 F.2d 578, 581-82, 212

USPQ 323, 326 (CCPA 1981). To establish inherency, extrinsic evidence must make clear that the descriptive matter missing from the references is necessarily present in the thing described in the reference and that it would be so recognized by persons of ordinary skill in the art. Inherency cannot be established by possibilities or probabilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. In re Roberston, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999). In relying upon a theory of inherency, the Examiner must provide a basis in fact or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the prior art. Ex parte Levy, 17 USPQ2d 1461, 1464 (BPAI 1990). Since the Examiner has not provided rationale or evidence to show that the coils of the references are moved or turned relative to the remainder of the coils until tests indicate optimum uniform plasma distribution is achieved in plural processors, inherency has not been established, and the rejection of claims 26 and 31 is incorrect.

2. The Various Combinations of References Result from Hindsight

The Final Rejection provides no suggestion or motivation to modify the four primary references in accordance with the disclosures of the secondary and/or tertiary references, or to combine the teachings of the secondary and/or tertiary references with the primary references.

The combination of Tobin et al. and/or Savas with the four primary references to arrive at the method of claims 26 and 31 results from hindsight. The Final Rejection points to no teaching, suggestion or motivation to combine Tobin et al. and/or Savas with the four primary references to arrive at the combination of claims 26 and 31. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed

invention where there is some teaching, suggestion or motivation to do so, found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. MPEP §2143.01. The Final Rejection does not provide an explicit showing of the foregoing discussed steps of claims 26 and 31. Further, the Final Rejection fails to satisfy the test for an implicit showing, as set forth by In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); in this regard, Kotzab states:

> The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art and nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art.

Since there is no showing that the problem which is resolved by the method of claims 26 and 31 is considered by the applied references and the references do not include all the claimed steps, the test for an implicit showing is not satisfied. Further, the Patent and Trademark Office must rely on objective evidence and must make specific factual findings with respect to the motivation to combine the references, which has not been done in the present case. "Common sense" cannot be the basis for an obviousness rejection. In re Lee, ibid.

The Final Rejection fails to establish a prima facie case of obviousness because all claim limitations are not taught or suggested by the prior art, i.e., all the words in claims 26 and 31 have not been considered in judging the patentability of these claims against the prior art. In re Royka, 490 F.2d 981,180 USPQ 580 (CCPA 1974), In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Based on the foregoing, the proposed combination of references is improper.

VIII. Conclusion

None of the references deal with the problem confronted by Appellants. Appellants realized that different processors of the same type have differing azimuthal electric field and plasma density distributions from processor to processor. Because of this factor, the typical fixed coil configurations of the prior art are not amenable to providing optimum uniform plasma distribution in each of a plurality of different processors. Appellants realized this problem could be resolved by turning or moving the exterior winding of coils having plural parallel connected windings relative to another winding of the coil from processor to processor until tests indicate optimum uniform plasma distribution is achieved in each processor. None of the references discusses testing of any type, no less testing plural processors to indicate optimum plasma distribution in each of plural processors. Because there is no attempt in the Office Action even to discuss the foregoing features, the rejection of claims 26 and 31 based on the various combinations of the references is improper. The rejections are also improper because no motivations are given for combining the references. The combinations are not based on evidence, but result from hindsight

Consequently, reversal of the rejection of claims 26 and 31 is in order.

Respectfully submitted,

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IX. Claims Appendix

Claim 26: A method of controlling the plasma flux distribution on a workpiece of an inductive plasma processor including a plasma excitation coil having a center axis and plural parallel connected windings adapted to be driven by an excitation source, the plural parallel connected windings being concentric with the axis so an exterior winding of the coil surrounds the remainder of the coil, the method comprising positioning the exterior winding relative to the remainder of the coil so the plasma density incident on the workpiece has a predetermined desired relationship;

the positioning step including turning the exterior winding and another winding of the coil relative to each other about the axis;

the exterior winding being turned relative to the another winding to assist in controlling azimuthal electric field distribution and azimuthal plasma density distribution of the processor; and

the method being performed on a plurality of different processors of the same type having differing azimuthal electric field and plasma density distributions from processor to processor and the exterior winding of each particular processor is turned relative to the remainder of the coil of the particular processor until tests indicate optimum uniform plasma distribution is achieved in each processor.

Claim 31: A method of controlling the plasma flux distribution on a workpiece of an inductive plasma processor including a plasma excitation coil having a center axis and plural parallel connected windings adapted to be driven by an excitation source, the plural parallel

connected windings being concentric with the axis so an exterior winding of the coil surrounds the remainder of the coil, the method comprising positioning the exterior winding relative to the remainder of the coil so the plasma density incident on the workpiece has a predetermined desired relationship,

the method being performed on a plurality of different processors of the same type having differing azimuthal electric field and plasma density distributions from processor to processor and the exterior winding of each particular processor is moved relative to the remainder of the coil of the particular processor until tests indicate optimum uniform plasma distribution is achieved in each processor.